

at 2.30 p. m., reaching a velocity of fifty-two miles per hour at 3.15 p. m. Considerable damage was done throughout the city to shade trees, signs, and chimneys. Telegraph and telephone wires were grounded and all communication was cut off for several hours. Several vessels were blown from their anchorage and damaged to a considerable extent, and a number of steamers injured by being pounded against the docks. The schooner "O. M. Bond," bound from Detroit for Buffalo, laden with twenty-two thousand bushels of wheat, was driven ashore at Eau Point: the vessel and cargo were lost and two men drowned.

Fort Wayne, Allen county, Indiana: a heavy southerly gale prevailed here during the afternoon of the 14th, unroofing a large number of buildings and uprooting trees.

Vevay, Switzerland county, Indiana: rain fell during the morning of the 14th until 8 a. m., at the same time the wind blew a strong gale, attaining a maximum velocity of seventy-five miles per hour at 10.45 a. m. Numerous trees and chimneys were blown down.

Toledo, Ohio: on the morning of the 14th the barometer was low and it continued to fall until 3 p. m., when it began rising rapidly, lowest reading, 29.35, at 3 p. m. Fresh southerly winds prevailed until 8 a. m., when it began to strengthen, and veering to the southwest, increased in force until 2.30 p. m., when it reached a maximum velocity of forty-four miles per hour. During the gale the water was blown out of the Maumee River to such an extent as to lower it seven feet, this is lower than it has been at any time since 1873. Much damage was done to buildings in all parts of the city, and work on all telegraph lines was interrupted.

Columbus, Ohio: the barometer fell steadily during the night of the 13-14th and until 12.30 p. m. of the 14th, when it stood at 29.50. At 1.05 p. m. the wind blew from the southwest with the force of a gale and continued until after midnight; highest velocity forty-five miles per hour between 1 and 2 p. m. Considerable damage was done to trees, frame buildings, fences, etc.

Sandusky, Ohio: rain, very heavy at intervals, began at 6.42 a. m. of the 14th, with rapidly falling barometer. A gale set in at 8.15 a. m. and continued all day, maximum velocity fifty-three miles per hour from the west at 5.20 p. m. During the 15th the wind blew hard from the northwest and the barometer rose rapidly.

Buffalo, New York: on the morning of the 14th the sky was partly overcast with cumulo-stratus clouds moving rapidly from the west, although the surface winds were from the southeast, having backed to that point from the southwest at 8.30 a. m. At 11.20 a. m. rain commenced and continued until 1.20 p. m., with barometer falling about .05 every hour, reaching 29.31 inches at 6 p. m. At 6.30 p. m. the wind, which had been blowing briskly from the south, veered suddenly to the southwest and increased in force, attaining at 8 p. m. the velocity of sixty-three miles per hour, although between 8 and 8.05 p. m. it blew at the rate of seventy miles per hour: for the four hours ending at 11 p. m. it blew at the average velocity of fifty-three miles per hour. This storm was more destructive to life and property than any that has occurred for several years. The water in a creek that flows through the city is reported to have risen seven feet higher than was ever known before, completely submerging a portion of the city and carrying away twenty-five frame houses and drowning several persons. At 8 p. m. the German Music Hall, in course of construction, was damaged to the amount of \$20,000, the entire west and southwest walls being blown down. Rain began again at 11.30 a. m. and continued throughout the night. The gale did not begin to decrease in force until 2 p. m. of the 15th, after having reached at 1 a. m. a velocity of fifty-six miles per hour. The 15th continued cloudy, with squalls of rain, rapidly rising barometer, and falling temperature. Snow fell from 11.55 p. m. of the 15th to 12.10 a. m. of the 16th. The storm signals which were hoisted at 11 a. m. of the 14th undoubtedly prevented many disasters to shipping.

Rochester, New York: during the 14th the barometer fell rapidly, and during the early morning brisk to high southerly winds set in; at 9.15 a. m. the wind had increased in force, and between 11 a. m. and noon blew from the south at the rate of forty-four miles per hour. At 9 p. m. the wind veered to southwest and shortly after again increased in force, veering to the west between 10 and 11 p. m. The gales were accompanied by rain. During the night of the 14-15th the gale continued to veer toward the northwest, attaining a maximum velocity of thirty-eight miles per hour between 12 and 1 a. m. of the 15th. Several buildings were unroofed and otherwise damaged by the high wind.

Parkersburg, Wood county, West Virginia: the gale of the 14th unroofed houses in various places near this town, and at Tygart Creek a large dwelling house and many fences and hay-stacks were blown down. At Point Pleasant the roundhouse on the Ohio River Railroad was demolished.

VII.—The midnight map of the 15th showed a depression of moderate extent developing in northern California, which had probably entered from the Pacific during the afternoon of that date. On the 16th this area, bounded by the isobar of 29.90, moved eastward, and was followed by an area of high pressure central on the Pacific coast. It developed little energy, however, until the afternoon of the 17th, when it became a well-defined depression, bounded by the isobar of 29.8, and central east of Salt Lake City, Utah, and moving slowly over the Rocky Mountains. It extended on the morning of the 18th in a pear-shaped, irregular ellipse to the Gulf of California. On that date the pressure at the centre rapidly decreased to 29.5,

with heavy southwesterly winds in Arizona and New Mexico, and southeasterly winds in Kansas and the Indian Territory. Very little rainfall attended its advance eastward on the 18th, and it gradually dissipated on the 19th by increase of pressure under the influence of a depression developing in Minnesota.

VIII.—This area, first noted on the afternoon map of the 19th, appeared as a secondary depression in the northern part of the trough of low pressure in the rear of low area number vii, and extending from the Rio Grande to the Saskatchewan. To the west of this a high area existed with its major axis in a line from the coast of Oregon to Salt Lake City, Utah. This low area first moved northward on the 19th and then curved to the east, followed by the area of high pressure which moved over the central Rocky Mountain region, Kansas, and Nebraska, producing heavy rains in the upper Mississippi valley. On the 20th it moved rapidly eastward, attended with rains in the Canadian Provinces and the Lake region, the centre of disturbance being north of the Saint Lawrence, and on the 21st disappeared eastward beyond the limits of observation, producing heavy rains in the lower lake region and Canada. The passage of this area over the Lake region was accompanied by heavy northwesterly gales.

IX.—An area of high pressure was central over the Ohio Valley, and another over California and Nevada on the afternoon of the 22d. In the northern part of the trough of low pressure which separated these two areas a storm-centre developed and moved to the southeast from the Saskatchewan Valley on that date, producing light rains in Minnesota, Dakota, and Iowa, and heavy thunder-storms in Kansas. The influence of the high area to the eastward somewhat retarded the progress of the storm-centre. The rain-area in front of the depression extended from Manitoba to northern Texas and eastward over the upper Mississippi valley. In the southern quadrant of the storm-centre the thunder-storm area extended from Dakota to the Valley of the Red River on the line of the major axis of the trough of low pressure. On the morning of the 24th the centre of disturbance was north of Lake Superior, and high northwesterly winds prevailed in Dakota and Nebraska, with southerly to southeasterly winds in the Lake region during that day. On the 25th the centre of disturbance drew slowly eastward north of the Saint Lawrence and disappeared beyond the limits of observation.

NORTH ATLANTIC STORMS DURING OCTOBER, 1886.

[Pressure in inches and millimetres; wind-force by Beaufort scale.]

The paths of the depressions that have appeared over the north Atlantic Ocean during the month are determined, approximately, from international simultaneous observations furnished by captains of ocean steamships and sailing vessels; abstracts of ships' logs and other data collected by the Signal Service agencies at the ports of New York, Boston, and Philadelphia; reports received through the co-operation of the "New York Herald Weather Service;" abstracts of ships' logs furnished by the proprietors of the "New York Maritime Register," and from other miscellaneous data received at this office up to November 21, 1886.

Fourteen depressions are traced, of which one, number 11, was a continuation of an area of low pressure which first appeared over the North American continent; number 1 was a continuation of ocean depression number 10 traced for September; number 2 continued land depression number xi charted for September; number 3 first appeared in the sub-tropical region north of the West Indies on the 3d and moved slowly northeastward until the 13th, from which date its forward motion was greatly accelerated, and the centre of depression passed to the northward of the British Isles by the night of the 14th or the morning of the 15th. This storm was very destructive on the British and French coasts from the 14th to the 16th, and, by reason of its track across the Atlantic being far to the southward of the generality of storms traced, surmises have been made in maritime circles as to its probable

birthplace. The origin and course of this great storm is, therefore, a matter of special interest.

Numbers 4, 5, and 6 first appeared to the eastward of the Labrador coast and are traced to the northward of the British Isles; number 7 apparently originated and dissipated over the ocean in the vicinity of the thirty-fifth parallel; numbers 8 and 9 were storms of marked energy which passed over the Bay of Biscay during the last half of the second decade of the month; number 10 first appeared south of Greenland and passed east and southeast to the coast of France; number 12 apparently originated south of Newfoundland and circling northeastward disappeared off the British coast; number 13 developed in the neighborhood of the West Indies and reports admit of tracing its track during two days; number 14 first appeared over mid-ocean and is last charted on the 31st to the westward of the British Isles.

The following presents the characteristics of the depressions traced for the present month, as compared with those traced over the north Atlantic for October, 1885.

In October, 1885, fourteen storm-areas appeared, all of which apparently originated over the ocean. One cyclone of great intensity (not charted) appeared suddenly over the English Channel on the 10th, when the barometer fell to 28.90 (734.0), and gales of hurricane force, from w. to nw., occurred over the ocean from W. 25° eastward over the Bay of Biscay to the French coast. Towards the end of the first decade and the commencement of the second severe gales prevailed over the western part of the ocean. During the second decade the pressure was low in the vicinity of the Azores; the data at hand, however, was insufficient to determine the paths of areas of low pressure that may have appeared in that neighborhood. During the last decade of the month areas of low pressure predominated over the British Isles and the ocean east of the twenty-fifth meridian, although during the last five days of that period two depressions appeared over mid-ocean, and one passed northeastward over the western portion.

In October, 1886 the month opened with an area of low pressure central over mid-ocean and one to the southward of Nova Scotia, the two combining to produce generally stormy weather west of the twentieth meridian. The first decade of the month was marked by the development or passage of five areas of low pressure over the ocean, which caused numerous gales and rough weather, save in the vicinity of Newfoundland, where relatively fair weather prevailed after the 3d. In the second decade two storms of great energy developed north of Spain and passed northward beyond the region of observation; two storms, one of which (number 3) has been previously referred to, passed to the northward of the British Isles, and one developed and disappeared over mid-ocean in low latitudes; during this decade the storm conditions were confined principally to the eastern part of the ocean. In the third decade five depressions are traced, all of which, except one (number 13), crossed the ocean in high latitudes.

A general summary of the weather conditions which prevailed over the north Atlantic during the month shows that the storms developed the greatest intensity off the west coast of Europe, from latitude N. 45° to 60°, and east of the thirtieth parallel; over the western portion of the ocean and along the coasts of the United States and the Canadian Maritime Provinces no storm of special energy occurred after the first two days of the month. The tropical hurricane which entered the Gulf of Mexico at the close of the first decade and commencement of the second was very destructive and exceptionally severe in its character, as is indicated by special reports received from observers at Havana and Key West, which, together with the reports of ship-masters who encountered the storm, will be found herein.

The following are brief descriptions of the depressions traced:

1.—This storm was central on the 1st in N. 48°, W. 29°, with central pressure about 29.40 (746.7), rain and fresh gales; whence it moved east until noon of the 2d, then circled north

off the west coast of Ireland and apparently passed to the westward during the afternoon of the 3d and united with, or was absorbed by, depression number 2 on the 4th. During the 2d the depression was attended by fresh to hard gales and rain, which conditions continued on the 3d and 4th, although during the latter dates a loss of energy was apparent.

2.—This storm passed off the coast of the United States in the vicinity of Boston during the early morning of the 1st, with central pressure about 29.40 (746.7), fresh to strong gales and rain; by the morning of the 2d it had moved northeast over Newfoundland, attended by fresh to hard gales and rain; during the 3d it moved east, with central pressure about 29.00 (736.6), and on the 4th passed southeast to N. 49°, W. 18° by noon of the 5th, with an appreciable loss of energy; during the next two days the depression moved east and disappeared in the direction of the French coast on the 7th.

The following special reports have been received relative to this storm:

The s. s. "Etruria," Capt. T. Cook, commanding, had a storm on the 1st; wind veered from se. to nw.; lowest barometer, 29.23 (742.4), at 1.40 p. m., in N. 42° 50', W. 60° 20'. Capt. G. Gerlach, commanding the bark "Pillan," reports: "1st, in N. 42° 28', W. 62° 30', 4 a. m., fresh southerly winds; 8 a. m., wind increasing; 10.15 a. m., storm-centre apparently to the eastward, sea very high, weather very thick, with rain, one of the sails carried away; 12 noon, barometer rising rapidly, wind continued in strong gusts from the n. until 1.30 p. m., when it shifted to w. and calmed down."

Capt. W. M. Rittig, commanding the s. s. "City of Washington," reports: "1st, fresh gale from sw. veering to n. during, and to easterly following, the disturbance; lowest barometer, 29.96 (761.0), at 6.30 a. m., in N. 37° 40', W. 74° 50'. Before this blow noticed peculiar-shaped, funnel-like clouds hanging over Cape Hatteras; one hour after the wind freshened from w., hauling to nw. and ne., attended in the easterly quarter by hard squalls and heavy rain; after the gale fine weather and ne. winds." The s. s. "River Ettrick," Capt. John Black, commanding, on the 1st, in N. 35° 10', W. 74° 57', had a fresh gale from n. veering to ne. The barkentine "Lydia," Capt. G. Lowery, commanding, had a hurricane on the 1st; wind veered from ese. to nw.; lowest barometer at 1 p. m., in N. 45° 10', W. 62° 15'. The s. s. "Adriatic," Capt. H. Parsell, commanding, had a whole gale on the 1st; wind veered from s. to nw.; lowest barometer, 29.16 (740.7), at 9.30 a. m., in N. 42° 0', W. 63° 15'. The s. s. "Zaandam," Capt. H. C. von der Zee, commanding, on the 3d, had a storm from sse. veering to nnw.; lowest barometer, 29.70 (754.4), at 11 p. m., in N. 48° 50', W. 38° 7'.

The s. s. "St. Rouans," Captain Campbell, commanding, on the 4th, in N. 48°, W. 29°, had a very severe storm, blowing for some time with hurricane force, with mountainous seas, which broke on board with great force, filling the decks, fore-castle, cabin, and wheel-house; the steam steering chains were carried away and engines were slowed, with head to the sea, until new chains were rove. Capt. Alex. McKay, commanding the s. s. "Catalonia," reports: "4th, in N. 48° 46', W. 38° 42' (at noon), experienced the first of a nw. gale; 2 a. m., wind shifted suddenly from sw. to nw. in a heavy squall; 8 a. m., wind nw., force 8, high nw. sea; noon, wind nw., force 8, high nw. sea; 4 p. m., moderating, wind nw., force 6, sea nw., rough; lowest barometer, 29.98 (761.5), at 8 a. m."

3.—Vessel reports of the 1st and 2d indicated the presence of a cyclonic area over the western portion of the Caribbean Sea, but were not sufficiently numerous to accurately locate its centre; by the 3d, however, the depression had passed to the northward of the West Indies in the direction of the east coast of Florida, and was central on the morning of that date in N. 29°, W. 76°, with hard gales to the north and west; from this position it moved slowly northeastward to N. 37°, W. 65° by the 7th, accompanied by disturbances of pronounced strength; from the 7th to the 13th it advanced slowly in a generally north of east direction to N. 44°, W. 43°; during this period

its probable track is given, as reports, while too scattering to accurately locate its centre each day, still furnish sufficient data to justify the approximate tracing of the storm's path. During the 13th and 14th the depression moved rapidly north-eastward, accompanied by very severe and destructive disturbances over a large area of the ocean, and disappeared north of the British Isles beyond the region of observation after the 14th. The storm first assailed the south and west British coasts on the night of the 14th, and raged as a destructive storm on the British and French coasts from the 14th to the 16th.

The following special reports indicate the characteristics of this cyclone:

Capt. Charles Acocks, commanding the bark "Mary," reports: "2d, in N. 31° 45', W. 71° 14' (at noon); 6 p. m., light breeze from ne., sea s.; 6.30 p. m., wind and sea increasing; 8 p. m., strong gale, sea mountainous from ne.; midnight, hard easterly gale, and black, cloudy weather. 3d, in N. 32° 35', W. 72° 10' (at noon); very heavy ne. sea, hard ne. gale, with heavy rain." The bark "Mary," on the 5th, in N. 34° 53', W. 74° 23' (at noon); at daylight had heavy squalls from nw. to ene.; noon, heavy clouds from se., wind ne. to nne.; 4 p. m., wind n., heavy lightning to the se. and e.; midnight, fresh to strong gale, with heavy ne. sea.

Capt. E. Smit, commanding the s. s. "Pietre de Conick," reports: "13th, in N. 48° 18', W. 25° 24' (at noon); 8 p. m., a strong gale began from sse, veered to s., sw., and w., and continued with increasing force until 6 a. m. of the 14th, in N. 47° 50', W. 28° 12' (at noon), when it veered to wnw. and blew a perfect hurricane from 6 a. m. to 8 a. m., the barometer having fallen to 28.90 (734.0); after 8 a. m. the gale began to moderate." Capt. J. H. Taat, commanding the s. s. "Edam," reports: "14th, in N. 50° 12', W. 17° 36' (at noon); from 9 a. m. to noon the wind increased to storm force; barometer fell to 29.00 (736.6); wind went to sw., with very wild sea and rain; at noon the barometer rose to 29.27 (743.4); during the afternoon the wind was from sw., with high, wild sea; 4 p. m., wind increased to hurricane, flying to nw.; barometer 29.42 (747.3). The sea was then frightful, a nw. sea running into a sw. sea; wind continued, varying from nw. to n.; barometer rose at night to 29.70 (754.4)."

Chief Officer Kinning, of the s. s. "Roman," Capt. D. Williams, commanding, reports: "14th, in N. 50° 53', W. 26° 38' (at noon); wind backed to s. at 1 a. m., and increased in force, with lightning and heavy rain; 5 a. m., backed to se., and veered to w. at 8 a. m., with rapidly falling barometer (lowest 28.80 (731.5) at 9 a. m.) and a furious gale from w. and very high seas; 10 a. m., wind veered to nw. and at noon to ne.; at 1 p. m. backed to n. and wnw., and continued a hard gale all day, with very high seas." Chief Officer Osienak, of the s. s. "Venetian," Capt. W. H. Trant, commanding, reports: "14th, in N. 51° 8', W. 22° 38' (at noon); moderate breeze in a. m. from sw., backing to s.; 8 a. m., increased to moderate gale, with rain; noon, strong gale s.; 2 p. m., terrific gale, with violent squalls; 4 p. m., veered to nw., and continued blowing strong gale from nw. through the 15th, in N. 51° 11', W. 26° 51' (at noon), with squalls, and heavy rain and hail squalls in the evening; lowest barometer, 28.72 (729.5), at 8 a. m. of the 14th."

Mr. Edward King, observer on the s. s. "Umbria," Capt. W. McMickan, commanding, reports: "13th, in N. 49° 25', W. 35° 10' (at noon); wind fresh from s., with heavy confused sea s.; 6 p. m., in a squall of heavy rain the wind shifted suddenly to nw., n., and ne., increasing to force 11, barometer having fallen rapidly to 28.95 (735.3); gale moderated on 14th and backed to westerly." The s. s. "Normandie," Capt. G. de Kersabee, commanding, on the 13th, had a whole gale from ne., backing to nw.; lowest barometer, 29.07 (738.4), at 4.50 p. m., in N. 48° 30', W. 36° 30'. This gale lasted only four hours, but the wind for two hours was at force 11, and the barometer fell very rapidly. Third Officer Prager, of the s. s. "Donau," Capt. H. Supmer, commanding, furnishes the following data descrip-

tive of the disturbance encountered by that vessel during the 13th:

Greenwich time.	Barometer.		Wind.		Latitude.	Longitude.	Remarks.
	Inches.	Milli-metres.	Direction.	Force.			
<i>Hours.</i>					°	'	
0.30.....	29.47	748.5	e. by n.	8	.....	.....	Heavy rain showers.
1.30.....	29.38	749.2	e. by n.	8	.....	.....
2.30.....	29.29	744.0	nne.	5	47 17	40 24	
3.30.....	29.20	741.7	ese.	5	.....	.....	Heavy rain showers.
4.30.....	29.16	740.7	se.	5	.....	.....	High cross sea from ne. to se.; heavy rain showers.
5.30.....	29.10	739.1	e. by n.	0	47 27	39 27	
6.30.....	29.04	737.6	e. by n.	5	.....	.....
7.30.....	29.00	736.6	ue. by e.	3	.....	.....
7.55.....	28.89	733.8	nne.	9	.....	.....
8.30.....	29.00	736.6	nne.	10	.....	.....
9.30.....	29.04	737.6	n.	11	.....	.....	Very heavy sea from n.
10.30.....	29.11	739.4	w.	11	47 30	35 33	
11.30.....	29.26	743.2	n. by w.	10	.....	.....	A long, high swell from sw.
12.30.....	29.38	746.2	n. by w.	10	.....	.....
13.30.....	29.48	748.8	nne.	9	.....	.....
14.30.....	29.54	750.3	nne.	9	47 33	37 30	Broken sky.
15.30.....	29.62	752.3	nw. by n.	9	.....	.....	Swell from sw. increasing.
16.30.....	29.70	754.4	nw. by n.	9	.....	.....	Very heavy and cross sea from n. and sw.
17.30.....	29.71	754.6	nw.	8	.....	.....
18.30.....	29.72	754.9	w. by n.	7	47 40	36 20	Decks constantly filled with water.
22.30.....	29.83	757.7	.....	.....	47 52	35 9	

Second Officer Francis Potts, of the s. s. "British Crown," Capt. Archibald Smith, commanding, reports having encountered a strong gale, force 9, on the 14th; lowest barometer, 28.65 (727.7), at 11 a. m., in N. 51° 14', W. 22° 5'; the gale was accompanied by very heavy seas. The s. s. "Erin," Capt. J. Robinson, commanding, on the 14th and 15th, in N. 49° 23' W. 10° 0' to N. 49° 56', W. 4° 19', had strong w. to sw. gales, with squalls of hurricane force. The s. s. "Marengo," Capt. W. Abbott, commanding, on the 14th had a whole gale from nw. to nne.; lowest barometer, 28.76 (730.5), at 1 a. m., in N. 49° 20', W. 33° 24'.

4.—This depression first appeared on the 6th, in N. 57° W. 34°, and, moving rapidly eastward, passed to the northward of the British Isles during the 7th. This storm apparently possessed considerable force, but passed too far to the northward to cause serious disturbances in the trans-Atlantic tracks.

5.—This depression followed closely after number 4 and pursued a similar course during the 7th, 8th, and 9th; its influence, however, was more widely extended, and hard gales were encountered during those dates as far south as the forty-fifth parallel.

The following special reports have been rendered relative to this storm:

The s. s. "Prussian," Capt. A. McDougall, commanding, on the 7th had a moderate gale from nw.; lowest barometer, 29.46 (748.3), at 12 noon, in N. 51° 20', W. 37° 48'. Chief Officer Bennington, of the s. s. "Martells," Capt. F. E. Jenkins, commanding, reports: "8th, in N. 50° 11', W. 26° 35' (at noon); 8 p. m., a fresh gale began from w., with high seas and squalls; barometer 29.39 (746.5) at noon." The s. s. "Celtic," Capt. B. Gleadell, commanding, had a strong gale on the 9th and 10th, from sse, veering to nw.; lowest barometer, 28.93 (734.8), at 5 a. m. of the 9th, in N. 51° 28', W. 13° 10'.

The tropical hurricane which is traced as depression number iv was first indicated by reports of the 7th, and moved slowly northwestward from the Caribbean Sea, passing over, or in close proximity to, the western extremity of Cuba during the early morning of the 9th; thence passing northwest into the Gulf of Mexico during the 9th, 10th, and 11th it circled westward to the vicinity of Galveston, Texas, during the 12th, and, passing northward, dissipated over Louisiana during the 13th. This storm is reported as having been one of the severest ever encountered in the Gulf of Mexico.

The following special dispatch was sent to the Chief Signal Officer from Havana on the 8th:

Barometer 29.89 (759.2), wind east, thirty-five miles an hour, with light rain. Storm central southwest from this station, moving northwest; probably recurring.

Rev. Benito Vines, S. J., director of the Belin College Ob-

servatory, Havana, Cuba, has collected and forwarded to the Chief Signal Officer information relative to this storm, as follows:

HAVANA, October 7, 1886—10 a. m.

Since yesterday indications of a cyclonic movement have been observed at sea, but up to the present hour it has shown itself of very small intensity; the centre of the storm is in the third quadrant to the ssw.

The storm is likely to make a recurve and cross the western portion of the island, in which case it is probable that we will have violent gusts of wind with rain from the east.

OCTOBER 8TH—NOON.

During last evening and night the storm increased somewhat in intensity, and has, as it appears, passed us by the wsw., so it is at this time crossing the western extremity of the island.

In Vuelta-Abajo it will be felt more severely than at Havana, in the form of heavy gusts of wind with repeated squalls from the e., moving s. and ssw.

The storm, it seems, is making a recurve, and it is yet likely its influence will be felt here during the evening and night with severe gusts of wind and rain from the second quadrant.

OCTOBER 9TH—10 a. m.

During last evening and night the entire storm advanced slowly, passing by the west, which will prove, it seems, that the recurve entered the extreme west of the island and passed parallel with Havana, causing a vortex at this time at about one hundred and fifty miles distance from here.

Since my last communication the barometer fell steadily up to 4 a. m. Sunday, the 10th, at which hour it reads 29.71 (754.5), corrected and reduced to sea-level, with gusts of wind from sse. to s., reaching, at times, fifty-six miles (twenty-five metres) per hour; sky obscure; squally, with light rain; wind presently settled from the s., oscillating slightly to the ssw., diminishing little by little in intensity.

In consequence, it is of much importance to note that the cyclonic winds during the storm have been greatly converging, a supposition which I entertained from its commencement.

During the whole day yesterday the sea rose high, with heavy swells from the nw., and it is noteworthy that the sea-swell increased up to last night.

The weather in Pinar del Rio.

The general government received yesterday the following telegram from the civil governor of Pinar del Rio, furnishing an account of the last storm which passed over those provinces:

"PINAR DEL RIO, October 13, 1886—8.10 a. m.

"I have been informed by the civil guard of San Luis that on the 9th they went out, accompanied by the local authorities, to examine the districts in the proximity of rivers, in order to save those who may be in danger, from there they will go to the shore of "Punta del Cartas" to extend similar services.

"In connection with the foregoing notice the following cards were received from two different towns in 'Vuelta-Abajo':

"VIALES, October 11, 1886.

"It seems almost impossible that the calamities in Vuelta-Abajo succeed one another with such frequency. On Thursday the 7th instant, at 5 p. m., a breeze set in, which though not causing particular anxiety at the time had a bad look; later in the evening it changed to south, and continued with various gusts; people commenced to seek refuge under neighboring shelters; the wind was accompanied by heavy showers and the roads became impassable. At 9 p. m. the wind and rain grew heavier; we passed the night in watching and opening the door for those who were looking for more secure lodgings.

"Unfortunate persons who in the recent cyclone lost many guano huts and tobacco houses had not recovered from their last misfortunes before this one to-day overtook them. Many of the handsome young tobacco plants, which were very luxuriant and near to enter into seed, were destroyed and annihilated by the heavy rain and wind, as a consequence there is nothing left of the actual tobacco crop for transplanting.

"SABALO, October 11, 1886.

"A cyclone, with heavy wind and rain, commenced during the 7th and ended yesterday at daybreak, devastating the tender tobacco plants, food of all kinds of the little left by the previous storms; various animals were drowned, and buildings blown over. The winds commenced by the north and ended by the west, the strongest being from the south. The state in most parts of Vuelta-Abajo is very deplorable, people being without any resources whatsoever to feed their children upon.

"According to information received from Guane, great damage has occurred from the overflow of Cuyaguatje River. No information as to personal injury has been received, and I do not think there has been any."

The Signal Service observer at Key West reports:

On the 8th cyclonic indications were observed; the weather was threatening and hazy, with very brisk east winds, having a tendency to be squally; barometer falling slowly; light sprinkling or misty rain. 9th, rain in heavy squalls up to 10.40 p. m.; thunder-storm in the evening, moving from se. to nw.; wind easterly, with gale velocity at times; in the evening two gusts of velocity, sixty miles; barometer falling all day to 29.79 (756.7) at 11 p. m.; wind hauled slowly from e. to se. Notifications of a cyclonic disturbance were posted in prominent places and precautionary measures were taken to insure the safety of shipping. 10th, gale continued, with wind hauling to s. and se., in heavy squalls; to the ne. and e. clouds were broken, while to the s. and sw. they were very heavy; barometer 29.72 (754.9) at 7 a. m.; be-

tween 1 and 2 p. m. wind hauled to s. and weather brightened; barometer remained stationary until 6 p. m., after which it rose and the weather cleared.

The s. s. "Professor Morse" encountered a hurricane on the 8th in N. 20° 30', W. 85° 20', during which oil bags were used on the weather side with good effect.

Capt. Frank Stevens, commanding the s. s. "Manhattan," reports: "Gale came on at 1 a. m. of the 9th, from nne., with very heavy squalls and slowly falling barometer. Ship on Campeche Bank in eighteen fathoms of water. Kept ship on the port tack under storm try-sail; wind backing very slowly to northward, and continued to back around to sw.; at 4 p. m., in N. 22° 15', W. 87° 18', the barometer read, lowest, 29.26 (743.2). 10th, 11.20 a. m., kept off on course ene.; very heavy sea running from all points of the compass, with ugly, threatening-looking weather; glass going up slowly all the time; arrived at Havana 2.30 p. m., where very heavy seas were breaking on the shores."

Captain Burrows, commanding the s. s. "San Marcos," furnishes the following report: "9th, 5.40 p. m., in N. 26° 0', W. 86° 30', barometer 29.90 (759.4), and falling; wind ne. by n., force 5; sky obscured and cloudy; heavy sea running from se. as well as from the quarter of the wind; ship sailed from above position thirty-six miles e. by s. $\frac{1}{2}$ s. at 2 a. m. of the 10th, at which time barometer indicated 29.60 (751.8) and wind had increased and rain became constant; from thence the drift of the ship was about three miles an hour sw; barometer fell rapidly to 29.10? (739.1)? at 10.40 a. m., and wind had hauled to n., blowing with irresistible force for about two hours. At 12.30 p. m. of the 10th barometer 29.15 (740.4); wind a heavy gale only, blowing from nw. for about four hours, then wsw. and sw. for about eight hours, or until 8.40 p. m., when clouds broke somewhat and wind went into a gentle gale, subsiding rapidly."

Capt. M. Garson, commanding the s. s. "Madrid," reports: "10th, 5 a. m., barometer 29.26 (743.2), wind ese., force 10; 7 a. m., in N. 24° 45', W. 84° 22', barometer 29.08 (738.6), wind se., force 11; 9 a. m. to noon, wind in gusts, blowing at times with hurricane force; air thick—not possible to see twice the length of the ship; swell from ese. and s., in waves of thirty feet in height; at noon the barometer stood 29.16 (740.7), with wind s., force, 12; wind began to moderate from s. shortly after midday. At 7 a. m. the engines were stopped and were not started for sixteen hours. Our reasons for this were twofold, viz., to allow the centre of the storm to get out of our track, and to prevent the risk of breaking down the engines by 'racing' in a very disturbed and irregular sea." The s. s. "El Paso," Capt. H. S. Quick, commanding, on the 10th, in N. 27° 0', W. 87° 40', had a gale from ene.; barometer 29.75 (755.6); 11th, in N. 27° 0', W. 86° 15', wind of hurricane force, backing slowly from ene. to sw.

The s. s. "Colorado," Captain Daniels, commanding, on the morning of the 11th encountered a terrific hurricane from the ne., which continued to rage for nine hours, when the wind changed to nw. and continued in that direction for ten hours; morning of 12th wind changed to east and continued for ten hours, when it came from an easterly point with a velocity of ninety to one hundred miles an hour, raising a terrific cross sea; barometer 29.05 (737.9), in N. 27° 10', W. 89° 0'. Capt. W. M. Rettig, commanding the s. s. "City of Washington," reports: "On the 13th, while lying in harbor at Vera Cruz, experienced a peculiar undulating swell from se.; ship broke stern moorings."

6.—This depression first appeared south of Greenland in W. 45° on the 10th, and, passing rapidly north of east, disappeared beyond the region of observation after the 11th. The storm was possessed of great energy and influenced the weather conditions to the fortieth parallel, and exhibited barometric pressure below 29.00 (736.6).

The following special reports concerning this storm are at hand:

Captain Bakker, of the s. s. "W. A. Scholten," reports that on the 10th, in about N. 48°, W. 38°, he encountered a whole west-

erly gale blowing about seventy miles an hour. Capt. G. de Kersabiec, of the s. s. "Normandie," reports having encountered a whole westerly gale lasting from midnight of the 9th to the 12th; lowest barometer, 29.26 (743.2), in N. 50° 15', W. 26° 45'. Captain Vogelgesang, of the s. s. "Rhaetia," reports a fresh westerly gale from the 9th to the 12th; lowest barometer, 28.76 (730.4), at 4 a. m. of the 11th, in N. 56° 1', W. 24° 38'. Capt. W. McMickan, of the s. s. "Umbria," reports a whole westerly gale, increasing to force 11, from the 11th to the 13th; lowest barometer, 28.95 (735.3), at 8 p. m. of the 11th, in N. 51° 0', W. 18° 30'.

7.—This storm apparently developed over mid-ocean and is first charted on the 14th in N. 35°, W. 53°, from which position it passed eastward to N. 35°, W. 47° by the 15th, accompanied by strong gales, and exhibiting central pressure about 29.50 (749.3). No special reports have been received relative to this depression.

8.—This depression first appeared on the 16th in the Bay of Biscay and passed to the west coast of England by the 17th, whence it moved beyond the limit of reports. The depression was accompanied by heavy gales and rain, and vessel reports show that severe weather was experienced over the British Isles and along the French coast during its passage, with barometric pressure ranging below 29.00 (736.6).

9.—This depression, following closely after numbers 3 and 8, caused a continuation of stormy weather off the west-central coast of Europe. The storm apparently advanced from the west and entered the Bay of Biscay on the 19th, whence it probably passed northeastward. While not as energetic as the depression (number 8) which preceded it, this storm caused violent gales off the French coast during the 18th and 19th.

10.—This depression first appeared over mid-ocean on the 20th in N. 56°, W. 33°, with central pressure about 29.60 (751.8), and moved eastward to N. 57°, W. 25° by the 21st, with an appreciable fall in pressure. By the 22d it had moved southeast to N. 54°, W. 17°, whence it passed to N. 48°, W. 9° by the 23d, during which date it disappeared in the direction of the French coast. The depression was accompanied throughout its course by fresh to strong gales and rain.

The following special reports have been received relative to disturbances encountered during its passage:

Captain Dunlap, of the s. s. "Manitoba," reports: "20th, in N. 51° 53', W. 32° 24' (at noon), a moderate gale began from w. at 8 a. m., veering to nw. and increasing to strong gale at midnight, with heavy squalls, and continued in a. m. of the 21st, with hard squalls and rain." Capt. T. H. Fox, of the s. s. "Istrian," reports: "20th, in N. 51° 20', W. 26° 0' (at noon), moderate to fresh westerly gales during the 20th and 21st."

11.—This storm was a continuation of land depression number viii and passed off the coast of Labrador on the night of the 21st. During the 22d it moved northeastward beyond the region of observation, without evidence of special energy.

12.—This storm apparently originated to the southward of Newfoundland and was central on the 24th in N. 45° W. 49°, whence it moved northeast to N. 58° W. 30° by the 27th, after which it passed eastward and disappeared north of the British Isles after the 28th.

The following reports indicate the general character of the disturbances encountered during the passage of this depression:

The s. s. "Istrian," on the 24th, in N. 46° 30', W. 46° 19' (at noon), had a strong gale beginning at 8 p. m. from nnw., with high seas; barometer 29.85 (758.2) at 9 a. m.; the ship pitched in a most violent manner, taking heavy seas on board. The s. s. "Egypt," Capt. J. Sumner, commanding, on the 25th and 26th, had a whole gale from sse., veering to nw.; lowest barometer, 29.45 (748.0), at 9.45 a. m. of the 26th, in N. 48° 33', W. 41° 7'. Capt. H. Parsell, of the s. s. "Adriatic," reports having encountered a whole gale on the 25th and 26th, from sse., veering to nw.; lowest barometer at 6.30 a. m. of the 26th, in N. 48° 40', W. 41° 0'.

Capt. G. Moody, of the s. s. "State of Georgia," reports: "Had a whole gale on the 26th and 27th from sse., veering to nw.; lowest barometer, 28.76 (730.5), at 11 p. m. of the 26th, in N. 53° 51', W. 30° 11'. We did not have the force of wind that the fall of the barometer would indicate, but had a terrible sea for two days after its passage. The wind shifted quickly but never exceeded force 9, and the barometer jumped up with the shift of the wind."

13.—This depression is first charted in N. 25°, W. 67° on the 23d, although scattering vessel reports indicated the presence of a cyclonic disturbance in the vicinity of Hayti on the 22d. The storm moved northeastward during the 23d and 24th, after which its course cannot be traced, owing to an absence of reports.

The following reports show the character of this depression and the disturbances attending it:

Capt. A. Alexander, commanding the s. s. "L. & W. Armstrong," reports: "22d, in N. 21° 11', W. 64° 20' (at noon); at 22 hours, barometer falling slowly; heavy cloud bank lying low from se. to ssw.; noon, barometer 29.70 (754.4); wind sse., force 6. 23d, in N. 23° 50', W. 64° 54' (at noon); 3 hours, barometer 29.60 (751.8); wind force 6 to 7; sea rising, rain squalls; 5 hours, heavy rain squalls, with thunder and lightning; barometer falling slowly; wind force 7; sea high, but regular. 10 hours, barometer 29.51 (749.5); wind sse., force 7; heavy sea and squally. 12 hours, wind sse., force 7 to 8; heavy rain keeping the sea down; barometer 29.50 (749.3). 15 hours, barometer 29.40 (746.7); wind sse., force 8 to 9; sea high, but regular; 15 hours 20 minutes, after a very heavy rain squall, with thunder and lightning, the wind hauled to sw. after a few moments lull. We had been steering north, hoping to clear the storm-track; now we had to steer ne., finding the se. sea dangerous; at 16 hours 30 minutes, hove ship to on starboard tack; barometer 29.30 (744.2); 18 hours, slight breaking away of clouds to the eastward, a heavy, dark gray bank of clouds in the westward, extending from s. to wnw.; clear overhead; barometer rising; wind hauled to ssw. and w. and barometer rose slowly; sea going down, and wind decreasing."

A. L. Shaube, mate of the bark "Essex," Captain Hall, commanding, reports: "On the 23d, in N. 26° 17', W. 64° 58' (at noon), had a strong gale from ese., with rain and squalls; wind backed to ne. at 8 p. m., with heavy rain squalls, and moderated at midnight." H. O. Marshall, observer on the ship "Magellan," Capt. E. S. Manion, commanding, reports: "24th, in N. 27° 49', W. 62° 31', a heavy gale from e. to ne.; barometer 29.45 (748.0) to 29.80 (756.9); lightning all around the compass; gale lasted, with heavy rain and high sea, twenty-four hours."

Mate Oliver Anderson, of the bark "Lilian B. Jones," Capt. E. F. Petrie, commanding, reports: "October 25th, in N. 25° 31', W. 58° 7' (at noon); at 2 a. m. a brisk gale began from ssw.; increased at 1 p. m. to hard gale ssw., with heavy seas; hove ship to; 5 p. m., heavy squall struck ship and hove her on beam ends; hard gale continued, shifting to n. at 9 a. m. of 26th, in N. 25° 38', W. 58° 33' (at noon), and continued a brisk gale till midnight, then moderated; lowest barometer, 29.78 (756.4), at 4 p. m. of the 25th." Captain Arnold, of the s. s. "Yorkshire," experienced a strong gale from ne., backing to wsw., on the 24th, in N. 34° 27', W. 63° 0'.

14.—This depression first appeared over mid-ocean on the 29th and circled northeast to N. 55°, W. 19° by the 31st. The storms accompanying this depression were very severe, as is shown by the following special reports:

Capt. R. H. Hughes, of the s. s. "Nova Scotian," reports: "29th, 10 p. m. (Greenwich mean time), in N. 52° 10', W. 23° 4', commenced hard squalls from sw.; strong gale during 29th, 30th, and 31st, from sw. to nw.; lowest barometer, 29.15 (740.4), at 9 a. m. of the 30th, in N. 52° 10' W. 26° 50'." Capt. K. Doyle, of the s. s. "Stockholm City," reports a westerly storm of hurricane force from the 29th to 31st; lowest barometer, 29.70 (754.4), at 12 midnight of the 29th, in N. 48° 31', W. 36° 14'. Capt. D. Meyer, of the s. s. "Hermann,"

reports a whole gale from sw. to nw.; lowest barometer, 29.45 (748.0), at 8 p. m. of the 31st, in N. 49° 27', W. 22° 13'.

Capt. W. Willegerod, of the s. s. "Trave," had a strong westerly gale on the 31st; lowest barometer, 29.57 (751.0), at 4 a. m., in N. 49° 34', W. 24° 0'. Capt. C. W. Kennedy, of the s. s. "Germanic," reports a strong gale on the 30th and 31st; lowest barometer, 29.29 (744.0), at 10.30 a. m. of the 31st, in N. 51° 32', W. 21° 30'. Chief Officer Miller, of the s. s. "Scandinavian," Capt. John Park, commanding, reports a strong gale from s. veering to nne. and backing to w. on the 31st; lowest barometer, 29.22 (742.2), at noon, in N. 54° 21', W. 18° 1'.

OCEAN ICE.

On chart i are also exhibited the eastern and southern limits of the region within which icebergs and field ice have been reported during October, 1886. These limits have been determined from reports furnished by shipmasters, and from trustworthy data published in the "New York Maritime Register" and other newspapers.

During this month the easternmost ice was encountered on the 28th, in N. 46° 03', W. 46° 37', by the s. s. "Etruria," and the southernmost ice reported was observed on the 5th, in N. 41° 34', W. 49° 43', by the s. s. "Borderer."

The icebergs reported were, in each instance, isolated, and, while they were encountered within a considerable area, the aggregate number observed was small, although in excess of the average for the month as determined from reports for the three preceding years.

A comparison with the chart for the preceding month (September, 1886), shows the number of icebergs observed to be about the same, although the area covered by ice reported during that month was much smaller, the southern limit being five degrees further north and the eastern limit about two degrees further west.

The following table shows the comparison between October, 1886, and the three preceding years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Lon. W.	Month.	Lat. N.	Lon. W.
October, 1883	46 56	46 22	October, 1883	46 56	46 22
October, 1884	near Cape Race		October, 1884	46 56	50 55
October, 1885	48 21	47 12	October, 1885	48 21	47 12
October, 1886	41 34	49 43	October, 1886	46 03	46 37

Icebergs were reported during the month, as follows:

1st.—The bark "Fluorine," at 7 p. m., passed an iceberg in N. 50° 48', W. 49° 30'.

3d.—The s. s. "Buenos Ayrean," in N. 52° 26', W. 52° 20', at noon, observed a large iceberg, sse., fifteen miles.

5th.—The s. s. "Borderer," at 8.30 a. m., in N. 43° 39', W. 49° 7', passed to the south of a large iceberg about three hundred feet high; also passed a large iceberg in N. 41° 34', W. 49° 43', which affected the temperature of the water twelve degrees at a distance of ten miles.

16th.—The s. s. "Hibernian," at 1.45 p. m. (Greenwich mean time), in N. 48° 18', W. 48° 57', passed an iceberg of moderate size.

17th.—The s. s. "Toronto," at 8.20 p. m., in N. 52° 30', W. 52° 0', passed an iceberg.

18th.—The s. s. "Toronto," at 6 a. m., in N. 51° 53', W. 55° 2', passed an iceberg.

20th.—The s. s. "Edam," in N. 47° 51', W. 47° 0', passed a large iceberg about one hundred and twenty feet high and twelve hundred feet long.

27th.—The s. s. "Egypt," at 2.30 p. m., in N. 46° 20', W. 47° 2', passed an iceberg.

28th.—The s. s. "Etruria," at noon, in N. 46° 03', W. 46° 37', passed an iceberg with two peaks about one hundred and fifty feet high.

FOG.

The following table shows the limits of fog-areas encountered

on the north Atlantic Ocean during October, 1886, as reported by shipmasters:

Dates.	Vessel.	Entered.		Cleared.	
		Lat. N.	Lon. W.	Lat. N.	Lon. W.
October 17th	S. S. "Venetian"	49 24	38 30		
October 17-18th	S. S. "Bothnia"	49 58	31 50	49 25	39 4
October 24th	S. S. "Galileo"	48 28	35 4	seven hours.	
October 28th	S. S. "Istrian"	42 29	56 9	at Boston.	
October 30th	S. S. "Galileo"	42 27	66 10	fourteen hours.	

In above instances fog was encountered with south to east winds.

SIGNAL SERVICE AGENCIES.

Signal Service agencies have been established in the Maritime Exchange buildings at New York City and Philadelphia, and in the Custom-House, Boston, where the necessary blanks and other information will be furnished to shipmasters.

In pursuance of the arrangements made with the Meteorological Office of London, England, there were cabled to that office from New York during October, 1886, four reports concerning storms and icebergs encountered by vessels in the Atlantic west of the forty-fifth meridian. One message was sent from Boston.

TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

The distribution of mean temperature over the United States and Canada for October, 1886, is exhibited on chart ii by the dotted isothermal lines; and in the table of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service. On chart iv the departures from the normal temperature are illustrated by lines connecting stations of normal or equal abnormal values.

In the following table are given the mean temperatures for the several geographical districts, with the normals and departures, as deduced from Signal Service observations:

Average temperatures for October.			
Districts.	Average for October, Signal Service observations.		Comparison of Oct., 1886, with the average for several years.
	For several years.	For 1886.	
New England	52.6	52.1	- 0.5
Middle Atlantic States	57.8	58.1	+ 0.3
South Atlantic States	65.8	64.4	- 1.4
Florida Peninsula	74.1	72.8	- 1.3
Eastern Gulf States	66.7	65.6	- 1.1
Western Gulf States	67.4	65.9	- 1.5
Rio Grande Valley	74.6	73.5	- 1.1
Tennessee	60.8	59.5	- 1.3
Ohio Valley	56.8	56.5	- 0.3
Lower Lake region	52.2	52.6	+ 0.4
Upper Lake region	47.6	50.9	+ 3.3
Extreme Northwest	42.4	46.6	+ 4.2
Upper Mississippi Valley	53.7	57.1	+ 3.4
Missouri Valley	50.8	56.0	+ 5.2
Northern slope	44.2	47.1	+ 2.9
Middle slope	51.6	55.2	+ 3.6
Southern slope	61.5	63.0	+ 1.5
Southern plateau	59.1	58.2	- 0.9
Middle plateau	49.7	48.0	- 1.7
North Pacific coast region	57.1	50.2	- 6.9
Middle Pacific coast region	61.0	58.3	- 2.7
South Pacific coast region	66.0	62.1	- 3.9

The mean temperature of the month is decidedly above the normal in the upper lake region, upper Mississippi valley, Missouri Valley, extreme northwest, and in eastern Montana; within these districts the departures are large, averaging 4° 5 and ranging from 6° 4, at Yankton, Dakota, to 2° 9, at Alpena, Michigan. In the south Atlantic and Gulf states the month is slightly cooler than the average October, the departures range from 0° 6, at Charleston, South Carolina, to 2° 9, at Chattanooga, Tennessee, and average 1° 3 below the normal.